

NON-PUBLIC?: N
ACCESSION #: 8903170282
LICENSEE EVENT REPORT (LER)

FACILITY NAME: PLANT VOGTLE - UNIT 1 PAGE: 1 OF 4

DOCKET NUMBER: 05000424

TITLE: Trip on Main Feed Pump on High Vibration Results in Manual Reactor Shutdown

EVENT DATE: 02/10/89 LER #: 89-005-00 REPORT DATE: 03/10/89

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION

50.73 (a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: J. E. Swartzwelder,

Nuclear Safety and Compliance Engineer TELEPHONE: 404-826-3618

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE TO NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On 2-10-89, at approximately 0050 CST, Control Room operators received Main Feedwater Pump Turbine (MFPT) "A" high vibration alarms. A check of the vibration monitor system showed a vibration of only 1.2 mils. (The vibration system alarms at 3 mils and trips at 5 mils). At approximately 0051 CST MFP "A" tripped. Steam/feedwater flow mismatch alarms were received on all 4 steam generators (SG). Turbine load was manually reduced to approximately 700 MWe and control rods placed in Auto to follow load. Steam dump valve controllers were manually operated to attempt to match steam/feed flow. At approximately 0053 CST, SG #4 reached 20% level and the Shift Supervisor directed the reactor to be manually tripped. Feedwater isolation and start of Auxiliary Feedwater (AFW) pumps occurred as expected. However, the Turbine Driven AFW (TDAFW) pump tripped on overspeed after starting.

The cause of the MFPT high vibration trip cannot be positively identified. The cause of the TDAFW pump overspeed trip, although not positively identified, may have been caused by particulate contamination of the lube oil,

which serves as the control system hydraulic fluid.

Corrective actions include temporarily installing vibration instrumentation to collect MFP vibration data. Additional surveillances were also performed on the TDAFW pump to ensure operability.

END OF ABSTRACT

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A. REQUIREMENT FOR REPORT

This report is required per 10 CFR 50.73(a)(2)(iv) because the reactor was manually tripped due to decreasing steam generator levels resulting from the trip of Main Feedwater Pump "A" on high vibration.

B. UNIT STATUS AT TIME OF EVENT

The Unit was in Mode 1 (Power Operation) at 100% rated thermal power at the time the event occurred. There was no inoperable equipment which contributed to this event.

C. DESCRIPTION OF EVENT

On February 10, 1989, at approximately 0050 CST, the control room received a Main Feedwater Pump Turbine (MFPT) "A" high vibration, alarm. The alarm annunciated and cleared approximately 3 times in 5 seconds. The Unit 1 Shift Supervisor (U1 SS) directed the balance of plant (BOP) operator to check MFPT "A" oil temperatures and pressures; all were normal. The U1 SS initiated the Advanced Turbine Supervisory Instrumentation (ATSI) printout to record vibration readings. The ATSI printout indicated a vibration of 1.2 mils. (The vibration system alarms at 3 mils and trips at 5 mils). The UT SS observed another 2-3 high vibration alarms which immediately cleared. At approximately 0051 CST, MFP "A" tripped. Steam/feedwater flow mismatch alarms were received for all 4 steam generators (SG). The U1 SS directed the BOP to reduce turbine load to 700 MWe. MFPT "B" was operated at maximum speed and control rods were placed in auto to follow turbine load. Main Feedwater Regulating Valves (MFRV) responded to lowering SG levels. Steam dump valve controllers were placed in manual to attempt to match steam/feed flow. SG #4 level reached 20% of wide range level and was still decreasing. The U1 SS directed the Reactor Operator (RO) to manually trip the reactor. The reactor and turbine were tripped at 0053 CST. Operators verified AFW flow as required by procedure.

Feedwater isolation and start of Auxiliary Feedwater (AFW) Pumps occurred as expected with the reactor trip. The Turbine Driven AFW pump (TDAFW)

started on receipt of a low-low water level in two of the four steam generators.

Subsequently, the TDOFW Pump was discovered tripped and a Limiting Condition for Operation (LCO) 1-89-100 was entered. At 0343 CST, surveillance of the TDAFW pump (Procedure 14546-1) was satisfactorily completed and the LCO was exited at 0348 CST.

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D. CAUSE OF EVENT

The cause of the main feedwater pump trip has not been determined. In an attempt to determine the cause of the trip of the main feed pump due to high vibration, vibration circuitry was checked, coupling guards were removed and the turbine-pump coupling inspected, a visual inspection of the front turbine standard was performed, turbine thrust bearing clearance was checked and turbine buckets were inspected. Lubricating oil was sampled (the oil did not appear to be dirty or scorched) and a ferrographic examination was performed and no abnormalities were found. The ATSI magnetic tape was removed and forwarded to a vendor for analysis. The results of the analysis were inconclusive. The turbine was disconnected from the pump and tested, which included 3 runs to overspeed with no unusual vibration noted, and pump thrust bearing clearances were checked. These checks did not reveal any problems. Based on a similar problem at Waterford 3 (Operating Experience OE 2813) MFP "A" was disassembled for inspection. There was no evidence of any foreign objects passing through the pump and no parts were missing.

The cause of the secondary event, overspeed of the TDAFW pump, has not been positively determined. In an attempt to determine the cause of the overspeed, data from the ERF computer was evaluated to determine if the TDAFW pump operated properly (ERF data showed the initial start and a ramp up to a discharge pressure of 1815 psi, which correlates to an overspeed condition). Speed control and differential pressure circuits and instruments were checked and a special surveillance was performed, starting from cold ambient conditions. The turbine/pump functioned properly, and no problems were found. The Magnetrol level control system, which is used to remove condensate from steam lines to the turbine, was examined. Testing was also performed to verify proper operation of the drain system. The TDAFW pump oil was sampled and analyzed. The oil sample was found to be contaminated with insulation. This oil serves as the hydraulic fluid for the governor actuator and remote servo. It is possible that the contamination caused sluggish operation of the governor and servo, resulting in the overspeed. In the absence of conclusive evidence this has been determined to be the most probable cause.

E. ANALYSIS OF EVENT

The loss of feedwater flow, due to the trip of the Main Feedwater pump, resulted in a rapid decrease of steam generator water levels that required a trip of the reactor. Control room personnel took appropriate actions to mitigate the results of this event. The trip of the TDAFW pump also did not present any feedwater flow problems as the two motor driven pumps started as designed and plant operators verified feedwater flow as required by procedure. Based on the above, it has been concluded that this event did not have any impact on plant safety or the health and safety of the public.

F. CORRECTIVE ACTIONS

1. Vibration monitoring instrumentation has been temporarily installed to provide continuous monitoring of MFPT vibration. Vibration information will be analyzed to monitor pump/turbine performance.
2. Additional surveillances are being performed on the TDAFW pump to ensure pump operability. These surveillances will continue, on a decreasing frequency, until the normal surveillance frequency is reached.
3. A maintenance work order has been written to drain the oil from the TDAFW turbine, to clean critical oil lines, to inspect filter bypass valve, to change the filter element, and to add new filtered oil. This work is to be performed during an outage for this system which is scheduled to start on, March 19, 1989.

G. ADDITIONAL INFORMATION

1. Previous Similar Events

None

2. Failed Components

None

- ##### 3. Energy Industry Identification System Code
- Feedwater system - SJ
Auxiliary Feedwater System - BA

ATTACHMENT 1 TO 8903170282 PAGE 1 OF 1

ELV-00326

March 10, 1989 0114M

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

NRC DOCKET 50-424
OPERATING LICENSE NPF-68
PLANT VOGTLE - UNIT 1
TRIP OF MAIN FEED PUMP ON HIGH
VIBRATION RESULTS IN MANUAL REACTOR SHUTDOWN

Gentlemen:

In accordance with 10 CFR 50.73, Georgia Power Company hereby submits the enclosed report relating to an event which occurred on February 10, 1989.

Sincerely,

W. G. Hairston, III
LRZ/PAH/gm

Enclosure: LER 50-424/1989-005-00

xc: Georgia Power Company
Mr. P. D. Rice
Mr. C. K. McCoy
Mr. G. Bockhold, Jr.
Mr. M. Sheibani
Mr. J. P. Kane
NORMS

U. S. Nuclear Regulatory Commission
Mr. S. Ebnetter, Regional Administrator
Mr. J. B. Hopkins, Licensing Project Manager, NRR (2 copies)
Mr. J. F. Rogge, Senior Resident Inspector - Operations, Vogtle

*** END OF DOCUMENT ***
